2 C210

CORRES. CONTROL
LTR. NO.
Originator Ltr Log #
MCB-043-98
97 - RF -

DIST.	LTR	ENC
BENSON, C.A.		
CARMEAN, C.H.		
CRAWFORD, A.C.		
DAWSON, D.		
EDWARDS, J.D.		
FINDLEY, M.E.		
FITZ, R.C.		
GUINN, L.A.		
HUGHES, F.P.	✓	
REED, A.B.		
TYSON, A.M.		
WAGNER, M.J.		
WHEELER, M.		
RMRS RECORDS	X	
RF CORRES. CONTROL		
TRAFFIC		
PATS/T130G		

CLASSIFICATION:		
UCNI		
UNCLASSIFIED		
CONFIDENTIAL		
SECRET		

AUTHORIZED CLASSIFIER SIGNATURE:

Date:

IN REPLY TO RF CC NO.:

ACTION ITEM STATUS:
PARTIAL/OPEN
CLOSED

LTR APPROVALS:

ORIG. & TYPIST INITIALS:
MCB:AW

RF-46469(Rev.1/97)

Rocky Mountain
Remediation Services, L.L.C.
... protecting the environment
ls Environmental Technology Site
64
olorado 80402-4064
(303) 966-7000

000102545

November 1, 1998

Brian Mathis
D&D Projects
Kaiser-Hill Company, L.L.C.
Building 130

ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE (RFETS) DECONTAMINATION AND DECOMMISSIONING CHARACTERIZATION PROTOCOL - MCB-043-98

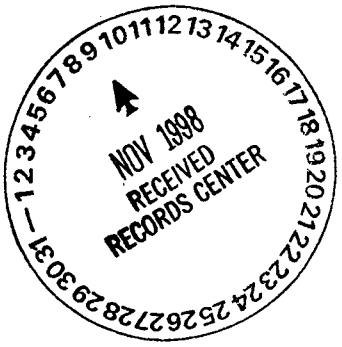
Please find attached comments to the "Draft Decontamination and Decommissioning Characterization Protocol (MAN-077-DDCP)." I will arrange to have individual commentators available at your convenience to discuss any of their comments or disposition responses. RMRS appreciates the opportunity to provide input to this very important document.

Shawn L. James for M.C. Broussard

M. C. Broussard
Manager Characterization

MCB/aw

Attachments:
As Stated



1/70

Best Available Copy

ADMIN RECCRD

SW-A-004461

REVIEW COMMENT SHEET

Time Spent on Review ___ hrs

If questions on content, please call the SME:

Return to:

3090	Tom Scott	2093	Building 130	Tom Scott	2093	Page 1 of
Fax	Name	Ext.	Location	Name	Ext.	

MAN-077-DDCP	0	1	D&D Characterization Protocol
Number	Rev.	Draft	Title

Please review the attached document

Comment Due Date 11/2/98

X ☐ Internal Review ☐ Parallel Review ☐ Verification ☐ Validation ☐ Revalidation

General (G) comments require resolution but do not require resolution acceptance. Mandatory (M) comments require resolution and resolution acceptance.

TYPE G or M	PAGE	SECTION OR LINE #	COMMENT	DISPOSITION	Disposition Accepted INIT/DATE
G	11	2.0 1st par.	To maintain consistency with MARSSIM consider breaking Scoping characterization/ Historical Site Assessment into seperate phases. Along the same lines, Final Status Survey is not a characterization but more like a verification that a Facility can be released.		
G	12	Classes	Type 1, 2, & 3 are opposite Class 1, 2, & 3 per MARSSIM. what data exists that supports 865, 886 and 991 as type 2. Recommend removing specific Building examples From Type descriptions.		
G	12	last para.	IS "HAS" intended to be "HSA" ?		

POC/Reviewer: (Comments not signed by POC/Reviewer will be considered unofficial and not subject to resolution)

☐ No Comments

☐ This procedure revision has no impact or relevance to our discipline or organization and we waive need to concur.

John Miller — Name

Signature

2454/~~6597~~ 6753 — Ext./Pager/Fax

9891C Rad. Eng. — Bldg./Organization

10/26/98 — Date

Concurrence

Name

Signature

Date

Rocky Mountain Remediation Services, L.L.C.
"protecting the environment"

ACTION/INFO ROUTING REQUEST

Date: 10/22/98

To: [illegible] INITIAL From: F. P. Hughes

ACTION	INFO				
Action Number:		[illegible]-99		Due: 10/30/98	Hughes, Fred VP Operations, T893A, X5841
	X	Coyne, Dan			
	X	Law, John			
	X	Overfield, Terry		COMMENTS:	
	X	Patterson, Jim		Furnishing new items of interest	
	X	Trice, Kelly			
	X	Wheeler, Martin			
	X	Fortune, Linda			
X	X	[illegible]			
	X	[illegible]			
	X				
	X				
	X				

ACTION COMPLETE
11/2/98
SEE ATTACHED LETTER

2

Return this form to Linda Fortune, Bldg. T893A to closeout the above action (or you may reference the action number in your hard copy submittal or verbal closure)

REVIEW COMMENT SHEET (continued)

Page __ of

Review comments for document: MAN-077 - DDCP (Number) ____ (Rev.) ____ (Draft)

TYPE G or M	PAGE	SECTION OR LINE #	COMMENT	DISPOSITION	Disposition Accepted INIT/DATE
m	13	2.3	IF the IP Characterization results must (shall) be documented in the Final Status Survey Plan, then completion of this Plan will be delayed until such results are obtained. Would be more appropriate to include IP characterization results only in FSS Report.		
m	15	3.13	Change "radiation" to "radiological"		
G	17	3.2	Grammar: missing word "be": results will be used.		

POC/Reviewer: (Comments not signed by POC/Reviewer will be considered unofficial and not subject to resolution)

John Miller (Name) ____ (Signature) 10-28-98 (Date)

Concurrence: ____ (Signature) ____ (Date)

4

REVIEW COMMENT SHEET (continued)

Review comments for document: MAN-077-DOCP (Number) ____ (Rev) ____ (Draft)

TYPE G or M	PAGE	SECTION OR LINE #	COMMENT	DISPOSITION	Disposition Accepted INIT/DATE
~~G~~ G	15	4.1.5.3	Add to 4.1.5.3 or Add step 4.1.5.4 That discusses methodology in MARSSIM Section 7.5.2.2 regarding contaminated surfaces which have been painted over.		
G	30	5.4.3	Why is burden of preparing FSSP put on Project Manager while Section 5.4.1 Does not assign the responsibility of developing the RLCP to any one.		
G	31	5.4.3	The P.M. may not be appropriate role to assign the responsibility of determining types numbers, location detection limits etc.		

POC/Reviewer: (Comments not signed by POC/Reviewer will be considered unofficial and not subject to resolution)

John Muller (Name) ____ (Signature) 10-28-98 (Date)

Concurrence: ____ (Signature) ____ (Date)

5

REVIEW COMMENT SHEET (continued)

Page of

Review comments for document: _____ Number _____ Rev. _____ Draft

TYPE G or M	PAGE	SECTION OR LINE #	COMMENT	DISPOSITION	Disposition Accepted INIT/DATE
G	32	6.0	where does this limit come from (No more than 2" in depth). There may be situations where cores are required at greater depth.		
G	36	7.0	Refer to section 2.4.6 Final Status Survey 4th Paragraph "Data From other surveys conducted ... such as scoping, characterization and remedial action support Survey ... provided they are of sufficient quality.		

POC/Reviewer: (Comments not signed by POC/Reviewer will be considered unofficial and not subject to resolution)

John Miller — Name

[signature] — Signature

10/28/98 — Date

Concurrence

_____ Signature _____ Date

6

REVIEW COMMENT SHEET (continued)

Review comments for document: MAN-077-DOCP

Number _____ Rev. _____ Draft

TYPE G or M	PAGE	SECTION OR LINE #	COMMENT	DISPOSITION	Disposition Accepted INIT/DATE
G	—	—	Is the intent to lump all characterization: → Chemical → Radiological into 1 Plan? If so, this plan may become very cumbersome. One characterization may hold up the other. To minimize overlap such as Intro, Facility history etc, A Single Plan with Appendicies For Radiological characterization chemical characterization may make a single Plan possible.		

POC/Reviewer: (Comments not signed by POC/Reviewer will be considered unofficial and not subject to resolution)

John Miller — Name

[signature] — Signature

10/26/93 — Date

Concurrence

_____ — Signature

_____ — Date

Date: August 29, 1998
To: Marla Broussard
From: Hopi Salomon
Subject: Review of Decontamination and Decommissioning Characterization Protocol, MAN-077-DDCP

General: The document contains some generally useful information and nice references to using the DQO process. However, there is very little substances for 49 pages of text. There are general references to RCRA characterization and tables that if used without the aid of knowledgeable RCRA SMEs will lead to inappropriate characterization/decisions. Here are the comments.

Section	Title	Comment	Response
1.3	Use of Document	3rd paragraph, If waste is being characterized for potential offsite disposal, how would the waste not be subjected to LDR?.	
2.3	IP Characterization	Include for samples that could not be isolated (locked out) during earlier characterization efforts because the systems were still being used	
4.1.5	Radionuclides	Change sanitary waste to Non-radiological, Change LLW to radioactive waste (don't be more specific, what about TRU)	
4.1.5, 5.1.5	RCRA Constituents	The statement "OR any one sample fails the RCRA characteristics...associated material is considered hazardous". This statement is inconsistent with the statements made in Section 3.1.6, regarding Limits and Decision Errors (e.g., 95% UCL). The plan needs to clearly differentiate between lot or batch sampling in which statistical evaluations are used and singular biased sampling in which a decisions will be made on the results of that sample, alone.	

General Comment		Protocol must include a site-wide approach to characterizing certain common materials with respect to RCRA constituents. A prime example is painted metal surfaces. The paint may contain high lead, chrome or other metals. Application of the 20x rule may be overly conservative, and the conservatism will be exacerbated if the bulk material itself is not sampled (sampling paint for total metals in lieu of sampling the metallic object with the paint for TCLP. To eleviate these concerns this plan/protocol should include negotiated agreements such as what Ted Hopkins has developed with the agencies regarding painted surfaces, and the incorporation of these agreements into this protocol.	
4.1.5, 5.1.5	PCBs	Incorporate the PCB Bulk Product disposal requirements into this document. Disposal of items such "applied dried paints" which contain PCBs may have substantially reduced disposal requirements and costs in accordance with the new PCB MEGA Rule.	
5.4.1	RLCP	Last paragraph: Most of this material (e.g., "specifics shall address the type and extent of strip-out ...") is more appropriate for the RCLR (Section 5.4.2).	
6.0	Sampling/Analysis	Sample mass of 10-30 g is incorrect for TCLP. SW846-Method 1311 requires at least 100 grams for the TCLP.	
6.2	PCBs	Review/incorporate the PCB MEGA Rule: PCB sampling may no longer be required on paint and most other solid, Bulk Product Material. Method 8080C is not a commonly used method for PCBs Consider removing Gaskets, electrical wiring and paints from the media requiring sampling	

6.3	RCRA Constituents	First the way the "20x" rule is used is very loose. Many labs provide "total concentration data" in ug/L. This could result in false positives with respect to characterizing a waste as hazardous. By noting the 0.014 mg/L UTS level for Be, it is implied that the other 268.48 UTS standards apply. This would include considerably lower concentrations for many of the items listed in Table 6-1. The use of Table 6-1 seems to simplistic and inappropriate. Suggest referencing 40 CFR 261 for characterization and 40 CFR 268 for waste related LDR issues.	
7.2.1	PARCC/Precision	LCS samples are used for laboratory accuracy, not precision. Suggest using a laboratory replicate or whatever the K-H Analytical Services Division nomenclature is for laboratory precision.	
7.2.4	Completeness	Suggest measuring completeness on an analyte type (e.g., semivolatile organics as opposed to individual analyte). If completeness is measured at the analyte level, the report will be very cumbersome. Remember their are approximately 96 analytes provided in an SW846-8270 SVOC analysis alone.	

Comment Resolution Form
Document: RFETS Decontamination and Decommissioning Characterization Protocol-BWM-029-98
Responses prepared by Ted A. Hopkins
Date: October 29, 1998

Type G or M	Page	Section or Line #	Comment	Disposition	Disposition Accepted Init/Date
G	5	2nd Paragraph	"(MARSSIM), issued in December 1997, and the This... Delete the and lower case T on this		
G	11	Type 1 facilities	• Surveys, if required, for hazardous substance contamination, AND Add after contamination, *show the building is not contaminated;*		
M	11	Type 1 Facilities	Programmatic question: Does the presence of Be contamination in a facility automatically make the facility a Type 2 or 3 facility? Clearly Be contamination is not integral to the building structure, therefore I would assume that answer is Yes. However, I am requesting clarification.		
M	12	1st sentence	991 is included as a Type 2 facility. RFCA identifies this building as requiring a DOP...a Type 3 facility. Delete 991 from this sentence.		
M	12	Type 3 Facilities	The list of Type 3 facilities does not include 991. 991 is identified in RFCA as requiring a DOP. Add 991 to this list.		
G	112	Section 2.1 3rd paragraph	An important component of scoping is the Historical Site Assessment..... Is the HAS a written report? If so, is there guidance on what its contents should be and who has to approve it?		
G	15	Section 3.1.3 2nd paragraph	The way this section is written it appears that only rad levels need to be qualitatively defined. Please clarify this language to include chemical hazards.		
G	17	4.0	Title needs to be corrected to read TYPE 1 Facilities Vs TYPE I facilities.		
M	18	4.1.4 1st paragraph under bullets	The characterization boundaries are limited....." What about underground process waste lines, USTs, and any contamination associated with these units? Isn't the operator responsible for characterizing these? If the waste lines were RCRA regulated and a release occurred from them, Closure would require these areas to be remedied.		

11

Type G or M	Page	Section or Line #	Comment	Disposition	Disposition Accepted Init/Date
			Add a section regarding underground lines, utilities, USTS, etc. and explain the characterization responsibilities for these units.		
M	21	1st paragraph	"All final results containing surveys and analytical results SHALL describe the results of the QC measurements...." Can the writer simply reference APO's contract requirements for their labs to maintain the appropriate QA/QC?		
M	22	Section 5.1.5 RCRA Constituents	(40 CFR 26)) is cited as defining listed wastes. This is incorrect the correct citation is 40 CFR 261.31, 261.32 and 261.33. Please correct.		
M	22	Section 5.1.5 RCRA Constituents	"OR any one sample fails the RCRA characteristics...." This is incorrect. Please modify as follows: OR a representative sample of the waste form fails.... SW846 requires a representative sample		
M	23	Section 5.1.5 Asbestos	Second bullet: If materials are found to be non-radioactive, non-hazardous, non-beryllium, non-TSCA and non..., then the material can be free-released or managed as sanitary waste" If a generator has Be contaminated asbestos, does this section either prevent the operator from disposing of the waste in a sanitary landfill or require the waste to be decontaminated before disposal? Wastes were never part of the new DOE Be standard. RFETS can dispose of Be contaminated wastes without meeting the free-release standards. Please modify this section or the Be section to clarify this issue.		
M	24	Section 5.2.1	Add the following bullets to DQOs for in-process characterization: • Is there sufficient data to conduct an LDR assessment for any waste going off-site for treatment/disposal? • Is there sufficient data to meet the WAC for the disposal facility?		
M	25	Section 5.2.5 RCRA Constituents	(40 CFR 26)) is cited as defining listed wastes. This is incorrect the correct citation is 40 CFR 261.31, 261.32 and 261.33. Please correct.		

Type G or M	Page	Section or Line #	Comment	Disposition	Disposition Accepted Init/Date
M	25	Section 5.2.5 RCRA Constituents	"OR any one sample fails the RCRA characteristics...." This is incorrect. Please modify as follows: OR a representative sample of the waste form fails.... SW846 requires a representative sample		
M	26	PCBS	1st bullet: Add the following...OR at levels agreed upon in the RFCA Decision Document for this project. [Risk based evaluations may allow the operator to leave much higher levels of PCBs in place rather than conduct a cleanup.]		
M	26	PCBS	Third bullet: This bullet does not apply solely to PCBS but is an all-inclusive comment. This section applies to asbestos, PCBs, Be, RCRA constituents, Make this section a stand-alone sections such as, 5.2.5.1 SANITARY WASTE/FREE RELEASE....and add it after Asbestos.		
M	29	5.4.1 Fourth Paragraph	Last sentence: If a unit is to be closed as part of deactivation... Delete deactivation and replace it with decommissioning.		
M	34	6.3	All media.....shall be characterized....for compounds or elements listed in Table 6.1. Table 6.1 does not address listed waste constituents that are not part of Table 6.1, nor Underlying Hazardous constituents found in 40 CFR 268.48. If a generator had a F001 listed solvent spill containing methylene chloride, under this section no sampling would be required. However, to meet LDR the waste stream would have to meet 40 CFR 268.40 standards. Another example for where Table 6.1 does not address COC would be: A generator has D018 waste stream. D018 waste streams must also be evaluated for contaminants that a generator might reasonably expect to be present as defined in 40 CFR 268.48. This section has to be modified.		

REVIEW COMMENT SHEET

Time Spent on Review: ___ hrs.

If questions on content, please call the SME:

Return to:

3090	Tom Scott	2093	Building 130	Tom Scott	2093	
Fax	Name	Ext.	Location	Name	Ext.	Page 1 of

MAN-077-DDCP	0	1	D&D Characterization Protocol
Number	Rev.	Draft	Title

Please review the attached document:

Comment Due Date: 11/2/98

X ☐ Internal Review ☐ Parallel Review ☐ Verification ☐ Validation ☐ Revalidation

General (G) comments require resolution but do not require resolution acceptance. Mandatory (M) comments require resolution and resolution acceptance.

TYPE G or M	PAGE	SECTION OR LINE #	COMMENT	DISPOSITION	Disposition Accepted INIT/DATE
			NO COMMENTS.		

POC/Reviewer: (Comments not signed by POC/Reviewer will be considered unofficial and not subject to resolution)

☒ No Comments

☐ This procedure revision has no impact or relevance to our discipline or organization and we waive need to concur.

Terry Overlid — Name — Signature

Ext./Pager/Fax — Bldg./Organization — 11/2/98 Date

Concurrence

Name

Signature — Date

14

REVIEW COMMENT SHEET

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If questions on content, please call the SME:

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3990 Tom Scott 2093 Building 130 Tom Scott 2093

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MAN-077-DDCP 0 1 D&D Characterization Protocol

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TYPE G or M	PAGE	SECTION OR LINE #	COMMENT	DISPOSITION	Disposition Accepted INIT/DATE
			NO COMMENTS.		

POC/Reviewer: (Comments not signed by POC/Reviewer will be considered unofficial and not subject to resolution)

X No Comments

☐ This procedure revision has no impact or relevance to my discipline or organization and we waive need to concur.

Kelly Trice — Name

Signature

X6383 — Ext./Pager/Fax

779 Project Mgr. — Bldg./Organization

11/2/98 — Date

Concurrence

Name

Signature Date

15

REVIEW COMMENT SHEET

Time Spent on Review: ___ hrs.

If questions on content, please call the SME:

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Fax	Name	Ext.	Location	Name	Ext.

MAN-077-DOCP | 0 | 1 | D&D Characterization Protocol

Please review the attached documents: Number | Rev. | Draft | Title

Comment Due Date: 11/2/98

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General (G) comments may or may not require resolution but do not require resolution acceptance. Mandatory (M) comments require resolution and resolution acceptance.

TYPE G or M	PAGE	SECTION OR LINE #	COMMENT	DISPOSITION	Disposition Accepted INIT/DATE
			Comments were provided to Ms. Marla Broussard		

POC/Reviewer: (Comments not signed by POC/Reviewer will be considered unofficial and not subject to resolution)

☒ No Comments

☐ This procedure revision has no impact or relevance to our discipline or organization and we waive need to concur.

P.M. Arnold — P.M. Arnold (Signature)

2056/212-6278/4308 — T130T — 10/2/98

Ext./Pager/Fax — Bldg/Organization — Date

Concurrence: P.M. Arnold (Name)

P.M. Arnold — 10/2/98

Signature — Date

Pat Arnold

16

REVIEW COMMENT SHEET

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If questions on content, please call the SME:

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2090	Tom Scott	2093	Building 130	Tom Scott	2093	Page 1 of
Fax	Name	Ext.	Location	Name	Ext.	

MAN-077-DDCP	0	1	D&D Characterization Protocol
Number	Rev.	Draft	Title

Please review the attached document:

Comment Due Date: 11/2/98

X Internal Review ☐ Parallel Review ☐ Verification ☐ Validation ☐ Revalidation

General (G) comments require resolution but do not require formative acceptance. Mandatory (M) comments require resolution and resolution acceptance.

TYPE G or M	PAGE	SECTION OR LINE #	COMMENT	DISPOSITION	Disposition Accepted INIT/DATE
			NO COMMENTS.		

POC/Reviewer: (Comments not signed by POC/Reviewer will be considered unofficial and not subject to resolution)

☐ No Comments

☐ This procedure revision has no impact or relevance to our discipline or organization and we waive need to concur.

Jim Patterson — J.W. Patterson — 11/2/98

Name — Signature — Date

Ext/Pager/Fax — Bldg/Organization

Concurrence

Name

Signature — Date

17

REVIEW COMMENT SHEET

Time Spent on Review: ___ hrs.

If questions on content, please call the SME:

Return to:

4641	W. BLODER	3394	B-116	Tom Scott	2093	Page 1 of
Fax	Name	Ext.	Location	Name	Ext.	

Please review the attached document: NOON

Comment Due Date: 11/2//98

MAN-077-DDCP	0	1	D&D Characterization Protocol
Number	Rev.	Draft	Title

X☐ Internal Review ☒ Parallel Review ☐ Verification ☐ Validation ☐ Revalidation

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TYPE G or M	PAGE	SECTION OR LINE #	COMMENT	DISPOSITION	Disposition Accepted INIT/DATE
M	8	1.0	The date is wrong for the DQO process document		
~~M~~	11	2.0	"Hazardous Substance" needs to be defined. Is this TSCA if so there is overlap with RCRA		
	12	2.1	Typo bottom of page "HAS" instead "HSA"!		
G			The use of "shall" should be removed in some instances. Each sentence should be evaluated to see if "shall" is used in the proper context		

POC/Reviewer: (Comments not signed by POC/Reviewer will be considered unofficial and not subject to resolution)

☐ No Comments

☐ This procedure revision has no impact or relevance to our discipline or organization and we waive need to concur.

Craig Condie / Craig Condie

Name Signature

Ext./Pager/Fax Bldg./Organization Date

Concurrence

Name

Signature Date

18 RMRS

REVIEW COMMENT SHEET

Time Spent on Review: ___ hrs.

If questions on content, please call the SME:

Return to:

3090	Tom Scott	2093	Building 130	Tom Scott	2093	Page 1 of
Fax	Name	Ext.	Location	Name	Ext.	

Please review the attached document: MAN-077-DDCP (Number) 0 (Rev.) 1 (Draft) D&D Characterization Protocol (Title)

Comment Due Date: 11/2//98

X Internal Review ☐ Parallel Review ☐ Verification ☐ Validation ☐ Revalidation

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TYPE G or M	PAGE	SECTION OR LINE #	COMMENT	DISPOSITION	Disposition Accepted INIT/DATE
			NO COMMENTS.		

POC/Reviewer: (Comments not signed by POC/Reviewer will be considered unofficial and not subject to resolution)

☐ No Comments

☐ This procedure revision has no impact or relevance to our discipline or organization and we waive need to concur.

Jim Patterson (Name) _____ (Signature)

_____ (Ext./Pager/Fax) _____ (Bldg./Organization) _____ (Date)

Concurrence

_____ (Name)

_____ (Signature) _____ (Date)

19

40

KAISER • HILL
COMPANY

Mala:
Pls coordinate our comments into 1 response back.
Fred

INTEROFFICE MEMORANDUM

DATE: October 19, 1998

TO: Distribution

FROM: Brian Mathis, D&D/Projects, Building 130, X3432

SUBJECT: ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE (RFETS) DECONTAMINATION AND DECOMMISSIONING CHARACTERIZATION PROTOCOL –BWM-029-98

ACTION:

Provide comments to Tom Scott, D&D Projects, on the attached Characterization Protocol by November 2, 1998.

Provided for your review and comment is the "Decontamination and Decommissioning Characterization Protocol". Kaiser-Hill D&D Projects is the lead organization responsible for preparing this document. It continues as a working draft and has been revised and re-formatted per previous comments in order to be re-issued as a site-wide controlled Requirements Manual.

This document contains site requirements for conducting facility characterizations on this Site as promulgated by the Rocky Flats Cleanup Agreement (RFCA), the draft Decommissioning Program Plan (DPP), and the Facility Disposition Program Manual (FDPM), currently being prepared. Once approved and issued, this document will replace the RFETS Facility Characterization Protocol dated September 15, 1998.

We would appreciate your comments on or before November 2, 1998. We plan on resolving comments beginning Tuesday, November 3, 1998.

20

During your review if you have questions or comments, please provide them to Tom Scott, D&D Closure Projects, Building 130, extension 2093.

RTS:cah

Attachment:
As Stated

Distribution

Jim Archibald
Roger Bacon
Jeff Barroso
Stan Bensussen
Hal Bluder
Dan Branch
Marvin Brailsford
Laura Brooks
Mark Brooks
Gary Coles
Miller Collins
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Dave Sheldon
Linda Smith
Phyllis Thomas
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MAN-077-DDCP	0	1	D&D Characterization Protocol
Number	Rev.	Draft	Title

Please review the attached document:

Comment Due Date: 11/2/98

X☐ Internal Review ☐ Parallel Review ☐ Verification ☐ Validation ☐ Revalidation

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TYPE G or M	PAGE	SECTION OR LINE #	COMMENT	DISPOSITION	Disposition Accepted INIT/DATE

POC/Reviewer: (Comments not signed by POC/Reviewer will be considered unofficial and not subject to resolution)

☐ No Comments

☐ This procedure revision has no impact or relevance to our discipline or organization and we waive need to concur.

Name _____ Signature _____

Ext./Pager/Fax _____ Bldg./Organization _____ Date _____

Concurrence

Name _____

Signature _____ Date _____

22

REVIEW COMMENT SHEET (continued)

view comments for document: _____ _____ _____
Number Rev. Draft

'E M	PAGE	SECTION OR LINE #	COMMENT	DISPOSITION	Disposition Accepted INIT/DATE

)C/Reviewer: (Comments not signed by POC/Reviewer will be considered unofficial and not subject to resolution)

_____ _____ _____
Name Signature Date

Concurrence

_____ _____
Signature Date

POLICIES & PROCEDURES
Points of Contact (POCs)
Document for Review
Monday, October 19, 1998

POC Information	Received by/Date	POC Information	Received by/Date
Hal Bluder(RMRS) X3394/fax 4641/116	_____	Gerry Kelly(EM&O) X4979/fax 2156/T130C	_____
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Kent Foster(WSLLC) X8360/fax 4052/T119B	_____		

MAN-077-DDCP Rev. 0

Please review the attached document(s) and respond by **COB 11/02/98**. If you have no comments and concur, please sign and date the comment review form and fax back to Tom Scott at 966-3090.

Rocky Flats Environmental Technology Site

MAN-077-DDCP

DRAFT
DECONTAMINATION AND DECOMMISSIONING CHARACTERIZATION PROTOCOL

REVISION 0

APPROVED_____ /Brian Mathis_____/_____

Division Manager, D&D Projects **Print Name** **Date**
Kaiser-Hill, LLC

CONCURRENCE BY THE FOLLOWING DISCIPLINES IS DOCUMENTED IN THE DOCUMENT HISTORY FILE:

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Legal
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Planning and Integration
Safeguards, Security, Site Operations & Integration
Safety Systems & Engineering

Rocky Flats Closure Site Services, L.L.C.
Rocky Mountain Remediation Services
Safe Sites of Colorado
Wackenhut Services, L.L.C.

USE CATEGORY 3

USQD Program Review:
ISR review:

Reviewed for Classification / UCNI

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Date _____

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LIST OF EFFECTIVE PAGES

Pages	Effective Date
1-52	11/20/98

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APPENDIX

EXECUTIVE SUMMARY

Kaiser-Hill Company, L.L.C. (K-H), the U.S. Department of Energy/Rocky Flats Field Office (DOE/RFFO), the Colorado Department of Public Health and Environment (CDPHE), and the U.S. Environmental Protection Agency (EPA) agree that building and facility characterization needs to be consistent when applied throughout the decommissioning program. To support this effort, the EPA Data Quality Objective (DQO) process **SHALL** be applied to the characterization process across the Special Nuclear Materials (SNM) Consolidation; Deactivation, Decontamination and Decommissioning (D&D); and the Environmental Restoration/Waste Management (ER/WM) Programs.

The RFETS D&D Characterization Protocol implements the requirements of the Facility Disposition Program Manual (currently in preparation) and provides guidance for conducting characterizations within Type 1,2 and 3 facilities. The NUREG 1575, *Multi-Agency Radiation Survey and Site Investigation Manual* (MARSSIM), issued in December 1997, and the This document describes the key D&D characterization phases; establishes DQOs for the various phases; and discusses sampling and analysis and related data review requirements.

ABBREVIATIONS/ACRONYMS

ACM	Asbestos-containing material
ARARs	Applicable or Relevant and Appropriate Requirements
Be	Beryllium
CAA	Clean Air Act
CDPHE	Colorado Department of Public Health and the Environment
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CHWA	Colorado Hazardous Waste Act
COCs	Contaminants of Concern
D&D	Decontamination and Decommissioning
DOE	U.S. Department of Energy
DOP	Decommissioning Operations Plan
DPP	Decommissioning Program Plan
DQA	Data Quality Assessment
DQO	Data Quality Objectives
EDD	Electronic Data Deliverable
EPA	U.S. Environmental Protection Agency
ER/WM	Environmental Restoration/Waste Management
FDPM	Facility Disposition Program Manual
FSS	Final Status Survey
FSSP	Final Status Survey Plan
FSSR	Final Status Survey Report
g	gram
HASP	Health and Safety Plan
HRR	Historical Release Report
HSA	Historical Site Assessment
IM/IRA	Interim Measure/Interim Remedial Action
IP	In-Process
K-H	Kaiser-Hill, L.L.C.
LCS	Laboratory Control Sample
LLMW	Low-Level Mixed Waste
LLW	Low-level Waste
MARSSIM	Multi-Agency Radiation Site Survey and Site Investigation Manual
MDA	Minimum Detectable Activity
Mg/l	Milligram/Liter
MRI	Midwest Research Institute
PARCC	Precision, Accuracy, Representativeness, Completeness, and Comparability
PCBs	Polychlorinated Biphenyl's
PE	Performance Evaluation
PEP	Project Execution Plan
PPE	Personal Protective Equipment
PQL	Practical Quantitation Limit
QA	Quality Assurance
QA/QC	Quality Assurance/Quality Control

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ABBREVIATIONS/ACRONYMS (cont'd)

QAPjP	Quality Assurance Project Plan
QAPP	Quality Assurance Program Plan
QC	Quality Control
RCRA	Resource Conservation and Recovery Act
RCTs	Radiological Control Technicians
RFCA	Rocky Flats Cleanup Agreement
RFCA/IGD	Rocky Flats Cleanup Agreement/Implementation Guidance Document
RFETS	Rocky Flats Environmental Technology Site
RFFO	Rocky Flats Field Office
RLC	Reconnaissance Level Characterization
RLCP	Reconnaissance Level Characterization Plan
RLCR	Reconnaissance Level Characterization Report
RIRs	Radiological Improvement Reports
RMRS	Rocky Mountain Remediation Services, L.L.C.
RWP	Radiological Work Package
SAP	Sampling and Analysis Plan
SNM	Special Nuclear Materials
SOW	Statement of Work
TCLP	Toxicity Characteristic Leaching Procedure
TRU	Transuranic
TSCA	Toxic Substances Control Act
TSDF	Treatment, Storage, and Disposal Facility
UCL	Upper Confidence Level
V&V	Verification and Validation
WAC	Waste Acceptance Criteria
WMP	Waste Management Plan
WO	Work Order
WSRIC	Waste Stream Residue Identification and Characterization

1.0 PURPOSE

The Rocky Flats Cleanup Agreement (RFCA, 7/96) establishes the regulatory framework for cleanup and closure of the Rocky Flats Environmental Technology Site (RFETS). Building disposition, including decontamination and decommissioning (D&D), is an integral part of RFCA which requires the development and implementation of a building characterization program at RFETS. Characterization is the process of identifying the chemical and radiological hazards associated with a building or building cluster. Information gathered during characterization SHALL be used to support facility disposition, including selection of decommissioning alternatives and the development of project specific documentation.

This protocol presents the requirements for characterizing buildings when developing D&D alternatives for Type 1, 2 and 3 facilities, as defined in the Decommissioning Program Plan (DPP) and Section 2 of this document. K-H will use characterization data to review and evaluate the risks associated with D&D and to define management options for building disposition.

Characterization **SHALL** be accomplished through the implementation of the U.S. Environmental Protection Agency (EPA) data quality objective (DQO) process and the application of approved and accepted characterization practices and methods. Documents used to develop this protocol included:

- Guidance for the Data Quality Objectives Process, EPA QA/G-4, September 1993;
- Nuclear Regulatory Guide (NUREG) 1575, Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM), December 1997;
- Decommissioning Resource Handbook, August 1995;
- DOE/RFFO, CDPHE, EPA, Final Rocky Flats Cleanup Agreement (RFCA), July 19, 1996;
- 40 CFR, Protection of the Environment, and 6 CCCR 1007.

1.1 OBJECTIVE

A key objective of this document is to provide direction, in support of the D&D Program, for a compliant, consistent and systematic approach to characterizing the radiological and chemical hazards associated with buildings and building clusters at RFETS. A key tool to ensuring a consistent approach and defining the basis for characterization is the application of EPA's DQO process. Additional document objectives include:

- To share the following information with stakeholders:
  - -- the set of key characterization processes and protocols used;
  - -- a set of data quality objectives and decision rules for various types of characterization campaigns; and

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-- the set of regulations and technical standards used to develop processes, protocols, DQOs and decision rules.

- To assist in the development of technically sound characterization documents, based on a common, consistent set of processes, protocols, DQOs and decision rules.

The benefits of using a compliant, consistent, systematic, DQO-based approach to characterization include:

- Enhanced stakeholder understanding;
- Enhanced D&D program credibility;
- Expedited approval of project-specific plans and decision documents;
- Consolidated guidance for RFETS project managers;
- Enhanced RFETS productivity;
- Implementation of pollution prevention measures;
- Compliance with applicable pollution prevention requirements and
- Cost savings.

In addition, implementation of this Characterization Protocol is a component of the RFETS Integrated Safety Management System. The Protocol requires advanced project planning to protect RFETS workers, the public and the environment by characterizing building hazards. It also requires characterization and evaluation of data throughout the D&D process to ensure that controls remain adequate to protect RFETS workers, the public and the environment.

1.2 SCOPE OF THIS DOCUMENT

This document consists of eight main sections plus an appendix. Following Section 1 is an overview of the four phased characterization process (Section 2), and a description of EPA's seven-step DQO process and its application to D&D characterization (Section 3). Section 4 then defines the DQOs for characterization of Type 1 facilities and presents the related documentation requirements, while Section 5 defines the DQOs for characterization of Type 2 and 3 facilities and their corresponding documentation requirements. Should the DQO process identify additional data needs, the sampling and analysis requirements for non-radioactive contaminants of concern (COC) are identified in Section 6. Section 7, discusses the types of data reviews required to ensure that collected data are of sufficient quality. Section 8, references relevant records management requirements, and Section 9, identifies the references used in preparing this manual. Finally, the Appendices present logic and flow diagrams and annotated outlines for various reports.

This document does not address the evaluation of characterization data to determine impacts on environmental media such as soil, surface and ground water, and air, and to assess compliance with related environmental regulations. Evaluation of environmental media and related regulations is addressed in the RFETS Integrated Monitoring Plan (IMP). The IMP is a RFCA-mandated document that is also based on the DQO process. The IMP addresses the monitoring of environmental media on both a site-wide and project-specific basis. For each environmental media, the IMP includes a template to develop project-specific monitoring DQOs, which would be consistent with the DQOs for routine, site-wide environmental

monitoring. Integration of site-wide and project-specific monitoring **SHALL** occur during the planning of all major D&D projects. Requirements for environmental evaluations are addressed by the Site Activity Environmental Assessment process, as presented in K-H Directive: DCS-001-98.

1.3 USE OF THIS DOCUMENT

This document is to be used in the preparation of project-specific characterization plans and reports for various characterization campaigns. It should be used to select and refine DQOs, based on the type of facility being decommissioned and the phase of decommissioning, and to prepare required characterization plans based on facility-specific conditions

This document also provides references to applicable regulations and to various characterization guidance documents and procedures. In addition, it references other D&D program documents and site infrastructure programs that **SHALL** be used during D&D characterization (e.g., the Facility Disposition Program Manual, the D&D Quality Assurance Program Plan [to be developed], and the Site's Sample Management and Waste Management Programs). Appendix A, "The RFETS Characterization Process," defines the process and requirements as they apply to SNM Programs, Type 1, 2 and 3 Facilities, and Government and Subcontractor Equipment. Those steps in the process to which the D&D Characterization Protocol applies, are "shaded" to reflect the need for D&D characterization data.

The type and extent of characterization depend, to a large degree, on the building disposition decision. This decision will determine whether characterization needs to be conducted to determine worker health and safety risks associated with building reuse or "mothballing", or based on building demolition and related waste disposal requirements (i.e., waste acceptance criteria (WAC) for specific treatment, storage and disposal facilities (TSDFs)). Therefore, D&D project managers **SHALL** involve various subject matter experts early in the planning process to determine characterization needs. For example, if material is to be recycled or if demolition debris is to be used as on-site fill, it may not be subject to hazardous waste regulations and related characterization requirements. Also, some waste may be classified as remediation waste under RFCA and may not be subject to all Resource Conservation and Recovery Act (RCRA) regulations (e.g., 40 CFR 268, Land Disposal Restrictions) and related characterization requirements. Such coordinated planning **SHALL** be used to develop cost-effective disposition options, focus characterization needs, and save money for other closure activities. Subject matters experts that **SHALL** be involved in planning and formulation of DQOs include specialists in the following disciplines:

- D&D technology;
- Radiological protection;
- Environmental protection;
- Waste management;
- Industrial hygiene;
- Measurement and analysis; and
- Quality assurance.

2.0 OVERVIEW OF THE CHARACTERIZATION PROCESS

As mentioned previously, characterization is the process of identifying the chemical and radiological hazards associated with a building or building cluster. Four (4) characterization phases were identified for use at RFETS: 1) Scoping Characterization/Historical Site Assessment; 2) Reconnaissance Level Characterization (RLC); 3) In-Process (IP) Characterization; and 4) Final Status Survey (FSS). These four phases were derived from the following documents: DOE/EM0142P, Manual for Conducting Radiological Surveys in Support of License Termination; DOE/EM, The Decommissioning Resource Handbook; NUREG-1575, Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM); and DOE Order 5820.2A, Radioactive Waste Management.

Characterization and decommissioning activities also **SHALL** be performed in accordance with all applicable regulatory requirements, including Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), RCRA, Toxic Substances Control Act (TSCA), Colorado Hazardous Waste Act (CHWA), and RFCA, as applicable. In addition, characterization activities **SHALL** be controlled by various RFETS D&D program plans, guidance documents, and procedures (e.g., the Integrated Work Control Program, the Integrated Safety Management System, the D&D Quality Assurance Program Plan (QAPP-in preparation), the Decommissioning Program Plan (DPP), and the Facility Disposition Program Manual (FDPM-in preparation).

Through the characterization process, RFETS facilities **SHALL** be "classified" based upon the level of potential or existing radiological and /or hazardous material contamination. Initial classification will be based on historical information and process knowledge. Site facilities **SHALL** be classified, per the DPP, as one of three types:

Type 1 facilities are "free of contamination," which means:

- Hazardous wastes and substances, if any, generated, stored, and/or spilled in the facility have been previously removed or cleaned up in accordance with State and Federal requirements and any RCRA units have been closed, or if partially closed, the parts of the unit within the facility have been certified as being clean closed (it will be insufficient to have RCRA units simply in a RCRA stable configuration.); AND

- Routine surveys for radiological contamination performed pursuant to the RFETS radiological protection program show the building is not contaminated; AND

- Surveys, if required, for hazardous substance contamination, AND

- If hazardous substances including PCBs and asbestos, are present, as an integral part of the building structural, lighting, heating, electrical, insulation, or decorative materials. As such they are not considered to be "contamination" per the DPP. Examples of Type 1 Facilities include Buildings 111, 116, and 130.

Type 2 facilities contain some radiological contamination or hazardous substance contamination. The extent of the contamination is such that routine methods of decontamination should suffice and only a moderate potential exists for environmental releases

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during decommissioning. Some buildings in this category, (e.g., buildings 865, 886, and 991) are now undergoing, or will undergo deactivation in certain areas prior to decommissioning. The mere fact that deactivation will occur does not push a building into the Type 3 category. Most buildings where industrial operations occurred that used hazardous substances or radioactive materials or both will fall into this category.

Type 3 facilities contain extensive radiological contamination, usually as a result of plutonium processing operations or accidents. Contamination may exist in gloveboxes, ventilation systems, or the building structure. Site personnel expect those buildings that were used for plutonium component production, along with the major support buildings for such production, have significant contamination, and are expected to be classified as Type 3. These Buildings include: 371/374, 559, 771/774, 707, 776/777, and 779.

Each characterization phase is described in the following paragraphs. Appendix B, "The D&D Characterization Process Logic Diagram" illustrates the D&D characterization process by facility type. It shows when the various characterization phases SHALL be performed and the various characterization plans and reports SHALL be prepared.

2.1 SCOPING CHARACTERIZATION/HISTORICAL SITE ASSESSMENT (HSA)

The Scoping Characterization and HSA phase, as defined in the DPP, establishes the scope of the project (i.e., schedule, budget, risk, and approach) and the initial facility classification. Establishment of the scope includes identifying the physical boundaries of the areas to be characterized. The boundaries may be a cluster of related buildings, a single building, or a room/area within a building. Establishment of the initial facility classification requires information regarding the hazardous and radiological condition of the building. Information gathering includes interviewing building personnel, and reviewing historical and operational

building information (e.g., including historical survey reviews, Safety Analysis Reports, records, incident reports, radiological improvement reports (RIRs), and any other pertinent Waste Stream Residue Identification and Characterization (WSRIC) information, and Historical Release Reports (HRRs)). In addition, at this time, an evaluation **SHALL** be made of any type of radioactive sources in the structure.

An important component of scoping is the HAS, an investigation to determine the historical information that may exist for a facility from the start of facility activities to the time of facility deactivation. The HSA **SHALL**:

- Identify potential, likely, or known sources of radioactive or hazardous substances and/or contamination;
- Provide a preliminary assessment of contaminant migration; and/or
- Provide information that may be useful in other characterization phases.

Scoping provides a basis for preliminary evaluations of decommissioning efforts and aids in identifying the need for more extensive Reconnaissance Level Characterization (RLC) and In-process (IP) Characterization surveys. Scoping **SHALL** be accomplished by the project team at the outset of a project. The output of this phase is either initial facility classification or modification of the existing classification.

2.2 RECONNAISSANCE LEVEL CHARACTERIZATION (RLC)

Per the DPP, this phase of characterization produces and overall assessment of the contamination, hazards, and other conditions associated with each building. The radiological and chemical (including PCBs and asbestos) condition of the building **SHALL** be assessed to identify radioactive or hazardous waste storage areas, contaminated areas and hazards, as well as physical obstacles or other conditions that could affect decommissioning activities. The RLC **SHALL** contain sufficient data to establish the basis for decommissioning activities. This phase **SHALL** include the review and comparison of information gathered during scoping with the planned decommissioning activities to identify data gaps and determine the need for additional sampling/surveys. If data gaps are identified during the DQO process, additional sampling/surveys **SHALL** be conducted. Instructions **SHALL** be developed and documented in the form of a RLC Plan. If data gaps are not identified, additional sampling/surveys are not required and the RLC Report is prepared. This report identifies the proposed official facility classification to DOE and the CDPHE.

2.3 IN-PROCESS (IP) CHARACTERIZATION

The IP phase of characterization is used to evaluate on-going D&D activities. This phase aids in identification of new hazards that may be uncovered during facility strip-out and decontamination. It is also performed to ensure that adequate data are obtained for waste management and transportation purposes. No formal IP Plan is required for agency approval. Results **SHALL** be documented in the Final Status Survey Plan and Report.

2.4 FINAL STATUS SURVEY (FSS)

This phase of characterization is performed after strip-out and/or decontamination is complete and before building disposition. This characterization **SHALL** be used to ensure that the building surfaces and/or structure meets all applicable release criteria for radiological and non-radiological constituents per the DQOs. Instructions **SHALL** be developed and documented in the form of a FSS Plan, and the results **SHALL** be documented in the FSS Report.

3.0 DATA QUALITY OBJECTIVES (DQOs)

This section describes the EPA DQO process (Section 3.1) and its application to D&D characterization (Section 3.2). Establishing characterization requirements SHALL involve identifying the decisions to be made as well as the data needed to make these decisions. Implementation of EPA's DQO process is necessary to determine the data needs of each D&D project, and to optimize the number and types of measurements and analyses relative to the available resources and ultimate project decisions. In short, the DQO process is a systematic

means to ensure that data used in the D&D Program, either historical or newly acquired, is legally and technically defensible so that decisions based on the data will, likewise, be legally and technically defensible.

3.1 DQO STEPS

The DQO process is comprised of the following seven steps:

1. State the Problem;
2. Identify the Decision;
3. Identify the Inputs to the Decision;
4. Define the Boundaries of the Study;
5. Develop the Decision Rule;
6. Specify Limits on Decision Errors; and
7. Optimize the Design for Collecting Data.

The following discussion addresses each of the seven steps with respect to D&D activities at the RFETS. Experience has shown that DQOs must be discussed in increasingly specific terms relative to program goals and project-specific goals as appropriate.

3.1.1 The Problems

The quantities and types of contaminated media, materials, equipment, and structures, floors, walls, and ceilings are not known with quantifiable confidence, and must be determined before management of waste streams can be performed. Adequate surveys/samples must be taken to properly characterize and manage the materials and/or equipment resulting from the D&D process. Other problems that might relate to final project actions are as follows:

- Why perform this characterization?

- What is the end use of the material, equipment, facility, or structure (free release, restricted use, low-level waste, etc.)?

3.1.2 The Decisions

Because D&D decisions SHALL determine data needs, decisions must be clear and well defined so that data needs may be clearly defined.

The critical technical decisions for a typical project are as follows:

- What types and quantities of materials (e.g., paint, concrete, pipe insulation, etc.), media (e.g., oil, solid, sludge, etc.), or equipment within the facility or area are contaminated and, conversely, not contaminated?

- What are the generic classification categories by which the media, materials, and/or equipment will be managed, relative to an eventual classification as contaminated (hazardous, radiological, mixed, etc.) or not contaminated (non-hazardous)? In other words, what are the categories of waste streams that will result from the activity?

- What are the ultimate dispositions (i.e., waste classifications and TSDF) of the waste streams, including quantities relative to WAC?

3.1.3 Inputs to the Decisions

Inputs to the decisions include both qualitative and quantitative data. Qualitative information typically consists of process knowledge derived from operating records and interviews, and nominal data (e.g., paint color, texture, or equipment type, etc.) derived from visual observation of a buildings equipment and materials. Quantitative data may be produced from analytical, radiation and other field surveys, and/or petrographic (asbestos) analysis of samples. Input can also includes historical data, provided quality control has been adequately established.

Inputs to the decision may include the following:

- Analytical/radiochemistry results;
- Analytical /radiochemistry QC data;
- Radiation survey results;
- Radiation survey QC data;
- Method-specific sensitivities (e.g., detection limits or minimum detectable activities);
- Error tolerances associated with the measurements (e.g., accuracy and precision); and
- Action levels (e.g., regulatory thresholds from RFETS free-release criteria or RFCA).

WAC are typically the drivers for decision inputs where data will be used to characterize waste streams destined for a particular TSDF (e.g., Nevada Test Site, Envirocare or USA Waste). Inputs to the decisions will be considered by contaminants of concern (COC). Waste types will be categorized by COC.

3.1.4 Project Boundaries

Project boundaries are the geographic area(s), three-dimensional volume(s), and temporal boundaries of the characterization activity. Other means of defining the project boundaries may be derived from the following questions:

- What is the sample population of interest?
- Are there any constraints (physical/temporal) on data collection?

Temporal boundaries are generally reflected in environmental regulations and refer to how often data need to be collected, the period of time a standard cannot be exceeded, the period of time over which data should be averaged, etc.

3.1.5 Decision Rules

Decision rules must be based on objective, reproducible, and measurable criteria. Determining errors associated with the decision rules is discussed in the following subsection.

Decision rules must correspond with the problem statements, the decisions, boundary constraints (spatial and temporal), and inputs. **Note: All decision rules must be considered prior to finalizing the characterization plan.**

3.1.6 Limits on Decision Errors

The amount of acceptable uncertainty associated with analytical results, radiological surveys, or radiochemistry results must be established in the planning phases of the D&D activity and accepted by mutual consensus of all parties involved, i.e., K-H (and their related subcontractor(s), and the DOE/RFFO. Mutual consensus is established through documented concurrence or approval from the affected parties, such as formal correspondence and/or signature pages contained within the controlled documents.

Limits on decision errors directly affect the quantity of samples required for statistical adequacy: the higher the confidence required in the decision, the more samples are required. Thus, the adequacy of the sampling set, relative to the number of samples taken, is also determined in this step of the DQO process. Based on the amount of error, or risk, that the project is willing to accept, the number of required samples can be calculated through EPA G-4.

False positive and false negative (Type I and Type II) errors typically range from 1% to 10% (i.e., confidences from 99% to 90%, respectively. In this protocol, the acceptable decision error limit is 5%, which translates to an upper confidence level (UCL) of 95%.

3.1.7 Optimization of Design

Modifications to the DQOs are typically based on visual observations, new information that reveals data gaps as the project progresses, and professional judgment, all of which are documented in the characterization process or in the Data Quality Analysis (DQA). If data gaps are identified, additional sampling must be conducted. The sampling design is modified and optimized until the required, minimum confidence is achieved for the associated project decisions. The design may go through several iterations of optimization, depending on the sample data available and the inferences made from each unique sample set.

3.2 APPLICATION OF DQOs TO THE D&D CLOSURE PROGRAM

As stated in Section 1.3, DQOs presented in this document **SHALL** be selected, refined as necessary, and incorporated into characterization planning documents based on the type of facility being decommissioned and the phase of decommissioning. Type 1 facilities **SHALL** undergo a combined reconnaissance level characterization and final status survey before being dispositioned. Only one set of DQOs **SHALL** be used for this combined characterization, as described in Section 4.1. If contamination is encountered during characterization, the facility may be re-categorized, and characterization requirements **SHALL** be changed (see Figure 2-1). Documentation requirements for Type 1 facilities are presented in Section 4.2.

Type 2 and 3 facilities may undergo three characterization phases before disposition, and use a slightly different set of DQOs for each type of characterization: reconnaissance level characterization, in-process characterization (as required), and final status surveys. DQOs for each of these characterizations are outlined in Sections 5.1, 5.2, and 5.3. Documentation requirements for Type 2 and Type 3 facilities are presented in Section 5.4.

Data sets from previous characterizations serve as a key input to each characterization phase and its related set of DQOs. Such data can significantly assist in focusing on the next

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characterization phase, thereby resulting in cost savings. The usefulness of previous data, however, will depend on its quality.

A means to ensure adequate data quality is the use of DQOs and adherence to this characterization protocol throughout all facility disposition and characterization activities. Characterization results will used by the project team to make various D&D decisions, such as technology selection, alternatives development, material release, and waste management. Results will also be used by other K-H Team organizations to make other project-related decisions relating to occupational safety, industrial hygiene, environmental protection, and regulatory compliance. Therefore, D&D project personnel **SHALL** provide characterization results to all appropriate K-H Team organizations.

4.0 TYPE I FACILITIES

This section defines the DQOs for characterization of Type 1 facilities, and presents the related documentation requirements. Documentation includes a Reconnaissance Level Characterization/Final Status Survey Plan and Report.

4.1 DQOs FOR RECONNAISSANCE LEVEL CHARACTERIZATION/FINAL STATUS SURVEYS

4.1.1 The Problem

- Is the amount of material, media, equipment, floors, walls and ceilings, interior/exterior to the buildings adequately quantified?
- Is the nature and extent of radiological and hazardous substance contamination known through process knowledge/history or adequately characterized so that all material, media, equipment, floors, walls and ceilings are considered to be sanitary waste?

4.1.2 The Decision

- Is there a sufficient inventory/estimate of materials, media, equipment, floors, walls and ceilings, interior/exterior to the building(s)?
- Is there sufficient process knowledge/history or sufficient radiological, RCRA, TSCA, and asbestos data to adequately characterize all materials, media, equipment, floors, walls and ceilings so they are considered to be sanitary waste?

4.1.3 Inputs to the Decision

- Assess magnitude and location of data from scoping/HSA.
- Identify applicable action levels, unrestricted release criteria, transportation requirements, waste management regulations, pollution prevention/waste minimization criteria, and the disposal facilities' waste acceptance criteria.

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4.1.4 Project Boundaries

- Identify spatial confines of building, including room, sets of rooms, or facility in 2 and 3 dimensions. Use engineered drawings for definition where available.

- Include temporal aspects of the project and applicable regulations.

The characterization boundaries are limited to the spatial confines of the facility itself and materials, equipment, equipment components, and media that make-up or are within the buildings (interior and exterior).

4.1.5 Decision Rules

- If there is a sufficient inventory/estimate of remaining materials, media, equipment, floors, walls and ceilings within the building, no additional inventory/estimates is necessary; otherwise additional inventory/estimates are necessary.

Radionuclides

- For materials, media, equipment, floors, walls and ceilings:

  1. If process knowledge/history supports the premise that no radioactive contamination is present, the related area and/or volume of material is considered sanitary waste.

  2. If all radiological survey/sample measurements are below the surface contamination thresholds provided in DOE Order 5400.5 (Radiation Protection of the Public and Environment) and/or are within background concentrations

     for volume contaminated material, the related area or volume of material is considered sanitary waste.

  3. If any radiological survey/sample measurements exceed the surface contamination thresholds provided in DOE Order 5400.5 and/or exceed background concentrations for volume contaminated material, the related area or volume of material is considered low-level waste (LLW).

RCRA Constituents

- If the SW-846 approved method sample set exceeds the RCRA toxicity characteristic threshold (20x the threshold values for solids, in ppm, listed in Table 6-1 as adopted from 40 CFR 261.24, Table 1), OR listed hazardous waste (40 CFR 260), OR any one sample fails the RCRA characteristics (reactivity, ignitability, and corrosivity), then associated material is considered hazardous waste; otherwise, the material(s) are considered non-hazardous waste.

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Beryllium

- If concentrations of beryllium are equal to or greater than 0.2ug/100 cm^2, the material is considered beryllium contaminated per the Occupational Safety and Industrial Hygiene Program Manual, Chapter 28, Chronic Beryllium Disease Prevention Program; otherwise the material is considered non-beryllium contaminated.

PCBs

- If the 95% UCL of the mean value of the sample set exceeds 50 ppm, then the associated material is considered TSCA waste; otherwise the material is considered non-TSCA waste.

Asbestos

- If any one sample of a sample set representing a homogeneous medium results in a positive detection (i.e., >1% by volume), then material is considered asbestos containing material (ACM); otherwise the material is considered non-ACM waste (40 CFR 763 and Colorado Regulation 8).

- If materials are found to be non-radioactive, non-hazardous, non-beryllium contaminated, non-TSCA and non-ACM, then material can be free-released or managed as sanitary waste.

4.1.6 Limits on Decision Errors

- The maximum value for false positive and false negative errors is 5% when calculating the number of samples required.

- Decision error does not apply to asbestos sample sets per 40 CFR 763. Results are compared with the action levels on a sample-by-sample basis.

4.1.7 Optimization of Plan Design

- If radiological, RCRA, TSCA and asbestos survey/samples are not required per the DQO process, a survey/sampling plan is not required.

- If RCRA, TSCA or asbestos survey/samples are required for materials, media, equipment, floor, wall and ceilings, refer to Section 6.0.

- If radiological survey/samples are required for floors, walls and ceilings, then a statistically based radiological survey/sampling program will be developed per the requirements in Section 5.5 of the MARSSIM.

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- If radiological survey/samples are required for floors, walls and ceilings, then the location of radiological survey/sampling points will be delineated per the requirements in Section 5.5 of the MARSSIM.

- If radiological survey/samples are required for floors, walls and ceilings, then radiological field measurement methods and instrumentation will be delineated per the requirements in Section 6 of the MARSSIM.

- If radiological survey/samples are required for floors, walls and ceilings, then radiological sampling and preparation for laboratory measurements will be delineated per the requirements in Section 7 of the MARSSIM.

- If radiological survey/samples are required for materials, media and equipment, then a radiological survey/sampling plan will be developed per the requirement in HSP 18.10, *Radioactive Material Transfer and Unrestricted Release of Property and Waste.*

4.2 DOCUMENTATION REQUIREMENTS

Type I facilities require two characterization documents: an RLC/Final Status Survey Plan and a RLC/Final Status Survey Report.

4.2.1 RLC/Final Status Survey Plan

Because Type I facilities are assumed to be free of contamination, these facilities can undergo a combined RLC/FSS to confirm that they are free of contamination. Therefore, project managers can prepare a combined RLC/Final Status Survey Plan. The plan **SHALL** identify building conditions and contamination per the DQOs identified in Section 4.1 and establish the basis for project planning, including facility strip-out, and demolition or re-use.

Characterization **SHALL** be based on process knowledge and/or history or on surveys/samples as required. If process knowledge/history is inadequate for characterization, appropriate characterization survey/samples **SHALL** be collected through selection and implementation of

the appropriate combination of direct measurement, sample collection and laboratory analysis, and physical observation. **An annotated outline for the RLC/Final Status Survey Plan is presented in the Appendix A.**

4.2.2 RLC/Final Status Survey Report

The characterization process results are documented in the RLC/Final Status Survey Report. The report **SHALL** provide an analysis of the characterization/survey results and summarize the hazards and risks associated with them. The report **SHALL** document the process knowledge and/or history and/or characterization survey results that demonstrates the building can be managed as sanitary waste. **An annotated outline for the RLC/Final Status Survey Report is presented in the Appendix A.**

All final reports containing survey and analytical results **SHALL** describe the results of Quality Control (QC) measurements, performance audits, systems audits, and confirmation sample comparisons performed for each sampling and analysis task. Any quality problems associated with performance methods, data completeness, comparability (including field and confirmatory data), and storage **SHALL** be documented with the corrective actions taken in response to the deficiencies identified. Refer to Section 7.0, which discusses data review requirements.

5.0 TYPE 2 AND TYPE 3 FACILITIES

- This section defines the three sets of DQOs associated with the characterization of Type 2 and Type 3 facilities

5.1 DQOs for Reconnaissance Level Characterization

5.1.1 The Problems

- Is the amount of material, media, equipment, floors, walls, and ceilings, interior/exterior to the building adequately quantified?
- Is the nature and extent of radiological and hazardous substance contamination adequately characterized so that material, media, equipment, floors, walls and ceilings can be categorized as sanitary, LLW, transuranic (TRU) waste, RCRA waste, TSCA waste, asbestos-containing waste, TRU mixed waste, and low-level mixed waste (LLMW)?

5.1.2 The Decisions

- Is there a sufficient inventory/estimate of materials, media, equipment, floors, walls and ceilings interior/exterior to the building(s)?
- Are there sufficient data to adequately characterize all materials, media, equipment, floors, walls and ceilings as sanitary, LLW, TRU waste, RCRA waste, TSCA waste, asbestos-containing waste, TRU mixed waste, and LLMW and meet transportation requirements?

5.1.3 Inputs to the Decision

- Assess magnitude and location of data from scoping characterization.
- Identify applicable action levels, unrestricted release criteria, transportation requirements, waste management regulations, pollution prevention/waste minimization criteria, and the disposal facilities' waste acceptance criteria.

5.1.4 Project Boundaries

- Identify spatial confines of building, including room, sets of rooms or facility in 2 and 3 dimensions. Use engineered drawings for definition where available.

- Include temporal aspects of the project and applicable regulations.

The characterization boundaries are limited to the spatial confines of the facility itself and materials, equipment, equipment components, and media that make-up or are within the buildings (interior and exterior).

5.1.5 Decision Rules

- If there is a sufficient inventory/estimate of remaining materials, media, equipment, floors, walls and ceilings within the building, no additional inventory/estimate is necessary; if the inventory/estimate is not sufficient, then additional inventory/estimates are necessary.

Radionuclides

- For materials, media, equipment, floors, walls and ceilings:

  1. If all radiological survey/sample measurements are below the surface contamination thresholds provided in DOE Order 5400.5 and/or are within background concentrations for volume contaminated material, the related area or volume of material is considered sanitary waste.

  2. If any radiological survey/sample measurements exceed the surface contamination thresholds provided in DOE Order 5400.5 and/or exceed background concentrations for volume contaminated material, the related area or volume of material is considered LLW.

  3. If any radiological sample measurements exceed 100 nanocuries/gram of plutonium and/or americium for volume contaminated material, the related volume of material is considered transuranic (TRU) waste.

RCRA Constituents

- If the SW-846 approved method sample set exceeds the RCRA toxicity characteristic threshold (20x the threshold values for solids, in ppm, listed in Table 6-1, as adopted from 40 CFR 261.24, Table 1), OR listed hazardous waste (40 CFR 260), OR any one sample fails the RCRA characteristics (reactivity, ignitability, and corrosivity), then associated material is considered hazardous waste; otherwise, the material(s) are considered non-hazardous waste.

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Beryllium

- If concentrations of beryllium are equal to or greater than 0.2ug/100 cm^2, the material is considered beryllium contaminated per the Occupational Safety and Industrial Hygiene Program Manual, Chapter 28, Chronic Beryllium Disease Prevention Program; otherwise the material is considered non-beryllium contaminated.

PCBs

- If the 95% UCL of the mean value of the sample set exceeds 50 ppm, then associated material is considered TSCA waste; otherwise material is considered non-TSCA waste.

Asbestos

- If any one sample of a sample set representing a homogeneous medium results in a positive detection (i.e.,>1% by volume), the material is considered asbestos containing material (ACM); otherwise the material is considered non-ACM waste (40 CFR 763 and Colorado Regulation 8).

- If materials are found to be non-radioactive, non-hazardous, non-beryllium contaminated, non-TSCA and non-ACM, then material can be free-released or managed as sanitary waste.

5.1.6 Limits on Decision Errors

- For radionuclides, no statistically based sample sets are required, thus decision errors do not apply.

- The maximum value for false positive and false negative errors is 5% when calculating the number of samples required for RCRA and TSCA characterization.

- Decision error does not apply to asbestos sample sets per 40 CFR 763. Results are compared with the action levels on a sample-by-sample basis.

5.1.7 Optimization of Plan Design

- A subjective radiological survey/sampling plan will be developed. This plan is developed to initially classify materials, media, equipment, floors, walls and ceilings as sanitary, low level and/or transuranic waste for decontamination and waste classification purposes.

- Radiological field measurement methods and instrumentation are described in Section 6 of MARSSIM. The requirements of Section 6 will need to be met during Final Status Survey.

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- Radiological sampling and preparation for laboratory measurements are described in Section 7 of MARSSIM. The requirements of Section 7 will need to be met during Final Status Survey.

- If RCRA, TSCA or asbestos survey samples are required for materials, media, equipment, floors, walls and ceilings, refer to Section 6.0.

5.2 DQOs FOR IN-PROCESS CHARACTERIZATION

5.2.1 The Problems

During strip-out:

- Is the amount of material, media, equipment, floors, walls and ceilings, interior/exterior to the buildings adequately quantified?

- Is the nature and extent of radiological and hazardous substance contamination adequately characterized so that material, media, equipment, floors, walls and ceilings can be categorized as sanitary, LLW, TRU waste, RCRA waste, TSCA waste, asbestos-containing waste, TRU mixed waste, LLMW?

5.2.2 The Decisions

During strip-out:

- Is there a sufficient inventory/estimate of materials, media, equipment, floors, walls and ceilings, interior/exterior to the building(s)?

- Is there sufficient data to adequately characterize all materials, media, equipment, floors, walls, and ceilings as sanitary, LLW, TRU waste, RCRA waste, TSCA waste, asbestos-containing waste, TRU mixed waste, LLMW?

5.2.3 Inputs to the Decision

- Assess magnitude and location of data from preceding characterizations, including data from scoping characterization, and contained in the RLCR, Decommissioning Operations Plan (DOP), and the Interim Measure/Interim Remedial Action (IM/IRA).

- Identify applicable action levels, free-release criteria, transportation requirements, health and safety requirements, waste management regulations, pollution prevention/waste minimization criteria, and the disposal facilities' waste acceptance criteria.

5.2.4 Project Boundaries

- Identify spatial confines of building, including room, sets of rooms or facility in 2 and 3 dimensions. Identify changes to facility/room configuration and content resulting

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- from strip-out and decontamination activities. Identify newly accessible and decontaminated areas.

- Include temporal aspects of the project and applicable regulations.

The characterization boundaries are limited to the spatial confines of the facility itself and materials, equipment, equipment components, and media that make-up or are within the buildings (interior and exterior).

5.2.5 Decision Rules

- If there is a sufficient inventory/estimate of remaining materials, media, equipment, floors, walls and ceilings within the building, no additional inventory/estimate is necessary, otherwise, additional inventory/estimates are necessary.

Radionuclides

- For materials, media, equipment, floors, walls and ceilings:

  1. If all radiological survey/sample measurements are below the surface contamination thresholds provided in DOE Order 5400.5 and/or are within background concentrations for volume contaminated material, the related area or volume of material is considered to be sanitary waste.

  2. If any radiological survey/sample measurements exceed the surface contamination thresholds provided in DOE Order 5400.5 and/or exceed background concentrations for volume contaminated material, the related area or volume of material may not be released. This area or volume of material is considered to be LLW.

  3. If any radiological sample measurements exceed 100 nanocuries/gram of plutonium and/or americium for volume contaminated material, the related volume of material is considered to be TRU waste.

RCRA Constituents

- If the SW-846 approved method sample set exceeds the RCRA toxicity characteristic threshold (20x the threshold values for solids, in ppm, listed in Table 6-1, (as adopted from 40 CFR 261.24, Table 1), OR listed hazardous waste

  (40 CFR 260), OR any one sample fails the RCRA characteristics (reactivity, ignitability, and corrosivity), then associated material is considered hazardous waste; otherwise, the material(s) are considered non-hazardous waste.

- If material is to be disposed as hazardous waste, the material will have to be disposed of in compliance with land disposal restrictions (40 CFR 268) and in conformance with TSDF WAC. For example, some characteristic wastes (i.e.,

ignitable, corrosive, reactive and organic wastes) will have to be characterized for underlying hazardous constituents.

Beryllium

- If concentrations of beryllium are equal to or greater than 0.2ug/100 cm^2, the material is considered beryllium contaminated per the Occupational Safety and Industrial Hygiene Program Manual, Chapter 28, Chronic Beryllium Disease
- Prevention Program; otherwise the material is considered non-beryllium contaminated.

PCBs

- For any PCBs remediated in/or removed from a building, the resulting surfaces must be verified for successful removal of the PCBs. If wipe tests, as defined and described in 40 CFR 761.123 and 761.125, produce values less than 10 µg/100 cm^2 or the 95% UCL of the mean is <50 ppm, PCBs have been successfully removed; otherwise PCBs remain above the stated action levels.
- TSCA-regulated waste **SHALL** be characterized in accordance with 40 CFR 761. Characterization requirements depend on the waste type (eg., PCB liquids, PCB items, porous surfaces, PCB remediation waste) and disposal options.
- If materials are found to be non-radioactive, non-hazardous, non-beryllium contaminated, non-TSCA and non-ACM, then material can be free-released or managed as sanitary waste.

Asbestos

- When friable and potentially friable asbestos is removed, if based on five air samples (>1200 L/sample), there are <70 (asbestos fibers)/ mm^2 as determined by Transmission Electron Microscopy and as described in 40 CFR 763, Subpart F, or Colorado Regulation Number 8, Pert B, Subsection III.C.6-8), the friable and potentially friable asbestos has been successfully removed; otherwise the building may contain friable asbestos.
- Asbestos waste **SHALL** be managed in accordance with 40 CFR 763, 40 CFR 261-268, CHWA and Colorado Regulation Number 8, Part B.

5.2.6 Limits on Decision Errors

- For radionuclides, no statistically based sample sets are required, thus, decision errors do not apply.
- The maximum value for false positive and false negative errors is 5% when calculating the number of samples required for RCRA and TSCA characterization.

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- Decision error does not apply to asbestos sample sets per 40 CFR 763. Results are compared with the action levels on a sample-by-sample basis.

5.2.7 Optimization of Plan Design

- A subjective radiological survey/sampling plan will be developed for remaining floors, walls, and ceilings. This plan is developed to classify floors, walls and ceilings as non-radioactive waste for Final Status Survey purposes.

- Radiological field measurement methods and instrumentation are described in Section 6 of MARSSIM. The requirements in Section 6 will need to be met during Final Status Survey.

- Radiological sampling and preparation for laboratory measurements are described in Section 7 of MARSSIM. The requirements in Section 7 will need to be met during Final Status Survey.

- For materials, media, equipment, floors, walls, and ceilings being released as low level and/or transuranic waste, radiological surveys/samples will be taken per Site Procedure 1-PRO-079-WGI-001, *Waste Characterization, Generation and Packaging.*

- If radiological survey/samples are required for materials, media and equipment for release as non-radioactive waste, then a radiological survey/sampling plan will be developed per the requirement in the RFETS HSP 18.10, *Radioactive Material Transfer and Unrestricted Release of Property and Waste.*

- If RCRA, TSCA or asbestos survey/samples are required for materials, media, equipment, floors, walls and ceilings, refer to Section 6.0.

5.3 DQOs FOR FINAL STATUS SURVEYS

5.3.1 The Problems

- Is there an adequate estimate of floors, walls and ceilings within the interior/exterior of buildings?

- Is the nature and extent of radiological contamination adequately characterized so that all remaining floors, walls and ceiling can be released as sanitary waste?

5.3.2 The Decisions

- Is there a sufficient inventory/estimate of floors, walls and ceilings within the interior/exterior of building(s)?

- Are there sufficient radiological surveys/samples to release all remaining floors, walls and ceilings as sanitary waste?

5.3.3 Inputs to the Decision

- Assess magnitude and location of data from preceding characterizations, including data contained in the RLCR, IM/IRA, DOP and IP Characterization.
- Identify applicable action levels, free release criteria, transportation requirements, waste management regulations, pollution prevention/waste minimization criteria, and the disposal facilities' waste acceptance criteria.

5.3.4 Project Boundaries

- Identify spatial confines of building, including room, sets of rooms or facility in 2 and 3 dimensions.

- Identify temporal aspects of the project.

5.3.5 Decision Rules

- For remaining floors, walls and ceilings:

  1. If all radiological survey/sample measurements are below the surface contamination thresholds provided in DOE Order 5400.5 and/or are within background concentrations for volume contaminated material, the related area or volume of material is considered to be sanitary waste.

  2. If any radiological survey/sample measurements exceed the surface contamination thresholds provided in DOE Order 5400.5 and/or exceed background concentrations for volume contaminated material, the related area or volume of must be dispositioned per Section 5.2 and resurveyed per Section 5.3.

5.3.6 Limits on Decision Error

- The maximum value for false positive and false negative errors is 5% when calculating the number of samples required.

5.3.7 Optimization of Plan Design

- A statistically based radiological survey/sampling plan will be developed per the requirements in Section 5.5 of MARSSIM.

- The location of radiological survey/sampling points will be delineated per the requirements in Section 5.5 of MARSSIM.

- Radiological field measurement methods and instrumentation will be delineated per the requirements in Section 6 of MARSSIM.

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- Radiological sampling and preparation for laboratory measurements will be delineated per the requirements in Section 7 of MARSSIM.

5.4 DOCUMENTATION REQUIREMENTS

Two characterization phases for Type 2 and Type 3 facilities require the following documentation: the Reconnaissance Level Characterization Plan (RLCP), the Reconnaissance Level Characterization Report (RLCR), the Final Status Survey Plan (FSSP) and Final Status Survey Report (FSSR). No formal plan is required for IP Characterization. IP Characterization results are documented in the FSSP and the FSSR.

5.4.1 Reconnaissance Level Characterization Plan

A detailed RLCP **SHALL** be prepared that describes the reconnaissance necessary to fully characterize a specific building, including building conditions, type and extent of contamination, and wastes. Such a plan **SHALL** address the DQOs identified in Section 5.1.1. The Plan **SHALL** also specify quality assurance requirements or a project-specific QAP **SHALL** be prepared. **An annotated outline for the RLCP is presented in the Appendix C.**

Development of the Plan **SHALL** involve reviewing information and data from previous characterizations and identifying data gaps based on the DQO problems and decisions (see Section 5.1.3, Inputs to the Decision). The focus of the RLC is to fill the data gaps. Based on data gaps and building-specific information (e.g., surface areas of floors, walls and ceilings), the Project Manager **SHALL** specify the types, numbers and location of samples and measurements; detection limits; error tolerances; and QA/QC requirements. The Plan should include table(s) to present input data, such as COCs, existing data on COCs, related action levels and free-release criteria (i.e., DQO decision rules), waste acceptance criteria for COC-containing material, transportation requirements, number and location of samples, required sampling and analysis methods and references, number of QA/QC samples, detection limits, and location of other hazards.

Characterization **SHALL** be achieved through selection and implementation of the appropriate combination of direct measurement, sample collection and laboratory analysis, physical observation, prior characterization and process knowledge. The gross presence and location of loose and fixed radiological contamination **SHALL** be identified. Past chemical spills and existing hazards also **SHALL** be characterized. In addition, characterization **SHALL** include identification of radioactive and hazardous materials, including any quantities of residual SNM, PCB- and asbestos-containing materials, lead- and PCB-based paints, and radioactive and hazardous wastes.

The management and characterization of RCRA units **SHALL** also be addressed. Units can either be closed as part of deactivation, or rendered RCRA-stable and closed under the D&D program. If a unit is to be closed as part of deactivation, closure activities, including characterization, **SHALL** be described in a closure description document and approved by CDPHE under CHWA. If a unit is to be closed as part of deactivation, closure activities, including characterization, **SHALL** be described in the D&D decision document and approved under RFCA.

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Characterization results **SHALL** be used to re-evaluate the facility type and the disposition decision. Results **SHALL** be used to prepare the CERCLA decision document, including alternatives development and analysis, health and safety analysis, determination of engineering support requirements, and determination of appropriate schedules. Specifics **SHALL** address the type and extent of strip-out and decontamination necessary, estimates on the types and volumes of waste anticipated, and controls needed for strip-out and decontamination, including personal protection equipment (PPE) and environmental controls. Results **SHALL** provide information in adequate detail to allow DOE to make a determination if the facility has significant contamination or hazards as described in Section 9 of the RFCA and to confirm the hazard categorization of the facility.

5.4.2 Reconnaissance Level Characterization Report

The documentation of RLC results is a RFCA-mandated report. This report **SHALL** provide an analysis of the characterization results and summarize the hazards and risks associated with the facility, including the nature and extent of radiological and chemical contamination and the types and volumes of wastes to be managed. Compliance with Data Quality will also be documented, as described in Sections 7 and 8. The report **SHALL** provide information in adequate detail to allow DOE to make a determination if the facility has significant contamination or hazards, as described in Attachment 9 of the RFCA. DOE will use the information from the report to confirm its categorization of the facility, and will transmit the report and a notification letter to the Lead Regulatory Agency for concurrence. The notification letter will include DOE's determination as to the facility type. Refer to Section 3.4.4 of the DPP for more detail on the process. **An annotated outline for the RLCR is presented in Appendix C.**

All final reports containing survey/sample results **SHALL** describe the results of Quality Control (QC) measurements, performance audits, and systems audits, and confirmation sample comparisons performed for each sampling and analysis task. Quality problems associated with performance of methods, completeness of data, comparability of data including field and confirmatory data, and data storage **SHALL** be documented with the corrective actions that have been taken to correct the deficiencies identified. Refer to Section 78.0, which discusses data review requirements.

5.4.3 Final Status Survey Plan

Project Managers **SHALL** prepare a detailed FSSP to determine the nature and extent of radiological and chemical contamination after strip-out and decontamination. Survey results **SHALL** be used to re-evaluate final disposition alternatives and to plan for demolition if demolition is the selected disposition alternative. Such a plan **SHALL** address the DQOs, including the problems and decisions, contained in Section 5.1.3. The Plan **SHALL** also address quality assurance requirements, or a project specific QAP **SHALL** be prepared. **An annotated outline for the Final Status Survey Plan is presented in Appendix C.**

Development of the Plan **SHALL** involve reviewing information and data from reconnaissance and in-process characterizations and identifying data gaps based on the DQO problems and decisions (see Section 5.1.3, Inputs to the Decision). Based on data gaps and building-specific

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information (e.g., surface areas of floors, walls and ceilings), the Project Manager **SHALL** specify the types, numbers and location of samples and measurements; detection limits; error tolerances; and QA/QC requirements. The Plan should include table(s) to present input data, such as COCs, existing data on COCs, related action levels and free-release criteria (i.e., DQO decision rules), the WAC for COC-containing material, number and location of samples, required sampling and analysis methods and references, number of QA/QC samples, detection limits, and location of other hazards.

Characterization **SHALL** be achieved through selection and implementation of the appropriate combination of direct measurement and sample collection and laboratory analysis. Any remaining loose and fixed radiological contamination must be identified. Areas of past chemical storage, use and spills also **SHALL** be checked for contamination. Results **SHALL** be used to estimate the types and volumes of waste anticipated, and controls needed for demolition.

5.4.4 Final Status Survey Report

The documentation of Final Status Survey results is a RFCA-mandated report. This report **SHALL** provide data on the nature and extent of radiological and chemical contamination after strip-out and decontamination. Compliance with Data Quality also **SHALL** be documented, as described in Sections 7 and 8. This report **SHALL** validate the premise that the building may be released as sanitary waste or material for recycle. **An annotated outline for the Final Status Survey Report is presented in Appendix C.**

All final reports containing survey results **SHALL** describe the results of QC measurements, performance audits, and systems audits, and confirmation sample comparisons performed for each sampling and analysis task. Quality problems associated with performance of methods, completeness of data, comparability of data including field and confirmatory data, and data storage **SHALL** be documented with the corrective actions that have been taken to correct the deficiencies identified. Refer to Section 78.0, which discusses data review requirements.

6.0 SAMPLING AND ANALYSIS

The DQO process will identify sampling and analysis needs. For example, if historical data or process knowledge is not available to make a D&D decision, sampling and analysis will be required. This section describes the minimum sampling requirements for the non-radioactive COCs (i.e., asbestos, PCBs, and RCRA constituents), as well as the methods required to determine chemistry of the samples. These methods **SHALL** be implemented following determination of the project-specific DQOs. This section does not address radiological swipes and sampling, radiological field measurement methods and instrumentation, and radiological sampling and preparation for laboratory measurement (refer to MARISSIM Sections 5.5, 6, and 7 respectively).

A general note applicable to all COCs, radioactive and non-radioactive, is as follows: if process or historical knowledge suggests that a medium is contaminated and the project assumes the associated risk of false positive results, the medium may be categorized as contaminated without further sampling prior to remedial actions. This rationale allows potential cost-savings relative to sampling and analysis, but has the associated risk of excess costs that result with

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managing hazardous/radioactive waste (when the waste is actually non-hazardous nor non-radioactive). Confidence in such a decision resides in the quality of the process and/or historical knowledge.

Samples **SHALL** be collected and submitted for analysis in bulk form pursuant to applicable regulations (i.e., in a form and cumulative composition most representative of the anticipated form of the waste stream). For example, samples of paints from walls constructed with cinder blocks should contain both the superficial paint layer(s) and a portion of the associated cinder block wall. Also, a minimum of 100 and maximum of 200 grams (g) of bulk sample, and a minimum of 10 and a maximum of 30 grams of paint chip sample, is often required for performance of the TCLP procedure. In addition, material should not be cored in excess of two inches into the material being sampled.

6.1 ASBESTOS

All surface materials and thermal insulation materials, suspected of containing asbestos, **SHALL** be sampled for asbestos per 40 CFR 763.86. A minimum of three samples are required per homogeneous area greater than six linear feet (ft) and <1,000 ft^2 in dimension; one sample is required for areas <six linear ft in dimension. Five samples are required per homogeneous areas between 1,000 ft^2 and 5,000 ft^2. Where homogeneous areas of >5000 ft^2 are encountered, seven samples are required. Samples are randomly selected from the centers of a square grid proportional to the size of the area. Grid spacing is only required for friable surfacing materials which may include drywall joint compound if suspected by the inspector.

The presence of friable asbestos (i.e., >1% by volume) **SHALL** be determined at a laboratory certified to Method EPA 600/R-93/116.

The generic categories of materials to be sampled are listed below:

- Thermal systems (e.g., pipe insulation);
- Surfacing materials (e.g., fireproofing, ceiling texture); and
- Miscellaneous (e.g., floor tiles, ceiling panels, concrete foundations and walls).

Based on the sampling results and the bulk materials represented by the samples, the quantities of friable and nonfriable ACM **SHALL** be estimated for subsequent abatement and waste management purposes.

6.2 POLYCHLORINATED BIPHENYLS (PCBs)

All materials, equipment, or media suspected of containing PCBs **SHALL** be sampled if previous process knowledge or sampling data is indeterminate relative to the medium of interest. At least two (2) random samples **SHALL** be acquired from each paint color or individual, unique solid medium of interest. A minimum of two samples provides an indication of variance in the medium of interest, as well as overall precision of the measurements.

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Each unique liquid **SHALL** be sampled per applicable site protocol or procedure, with an additional sample for each liquid phase if liquid stratification is suspected or confirmed.

Sampling and analysis to verify removal **SHALL** comply with 40 CFR 761.123 and **761**.125 or 40 CFR 761.130. Compliance with 40 CFR 761.130 **SHALL** be attained through the following criteria:

- A sampling area that is equal to the original spill area plus 20% or an additional one-foot boundary;
- 95% confidence limit (against false positives); and
- A minimum of three samples taken via the Midwest Research Institute (MRI) method (EPA, 1986), which implements a hexagonal grid sampling design.

The analytical method **SHALL** have a practical quantitation limit (PQL) of less than 50% the regulatory threshold of 50 ppm. The SW-846 analytical method, 4020 (portable field kit) or 8020C (off-site analysis in a fixed lab), are recommended.

The newly EPA-accepted field method 4020 **SHALL** be used for determination of total polychlorinated biphenyl's (PCBs) using immunoassay test kits. A mini methanol extraction of the sample is performed (for solid matrices), and the extract and an enzyme conjugate reagent are added to immobilized antibodies. The enzyme conjugate competes with the PCBs in the sample for binding to immobilized anti-PCB antibodies. The test is interpreted by comparing the response produced by the sample to the response produced by a standard.

The following media **SHALL** be sampled for PCBs if process knowledge is indeterminate for PCB content:

- Transformers;
- Capacitors;
- Fluorescent light ballasts;
- Gaskets in potential PCB-containing systems (e.g., heating, air-conditioning and ventilation);
- Electrical wiring; and
- Paints.

Liquid media **SHALL** be sampled per the site protocol.

All samples from painted surfaces (non-asbestos samples) acquired for lab analysis **SHALL** be acquired by ASTM Method E 1729-95, *Standard Practice for Field Collection of Dried Paint Samples for Lead Determination by Atomic Spectrometry Techniques.*

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6.3 RCRA CONSTITUENTS

All media potentially contaminated with RCRA constituents shall be characterized using process knowledge and/or analyzed for compounds and elements listed in Table 6.1. Analytical methods **SHALL** have PQLs at levels at least 50% less than the regulatory thresholds listed in Table 6.1. The beryllium regulatory threshold, not listed in the Table, **SHALL** be 0.014 mg/L (Universal Treatment Standards, 40 CFR 268.48; nonwastewater standard).

The following SW-846 method or equivalent industry proven method **SHALL** be used for analyses:

• Metals (incl. Be)	6010B
• Mercury	7470A (liquid) 7471A (solids)
• Semi-volatiles	8270C
• Volatiles	8260B
• Pesticides	8081A
• Herbicides	8151A
• Ignitability	1010 or 1020A (liquids) 1030 (solids)
• Corrosivity	1110 or 1120
• Reactivity	HCN Test Method or H_2S Test Method

Both total analysis and the TCLP can be used to characterize solid samples. If total analysis is used, results **SHALL** be divided by 20 before comparison with the Table 6-1 regulatory thresholds. If TCLP is used, the SW-1311 preparation on method **SHALL** be used. The Paint Filter Test, SW-9095A, **SHALL** be used for sludge for determining whether liquid or solid units shall be reported.

Table 6-1 Maximum Concentration of Contaminants for the Toxicity Characteristic

EPA HW No. \1\	Contaminant	CAS No. \2\	Regulatory Level (mg/L)
D004	Arsenic	7440-38-2	5.0
D005	Barium	7440-39-3	100.0
D018	Benzene	71-43-2	0.5
D006	Cadmium	7440-43-9	1.0
D019	Carbon Tetrachloride	56-23-5	0.5
D020	Chlordane	57-74-9	0.03
D021	Chlorobenzene	108-90-7	100.0
D022	Chloroform	67-66-3	6.0
D007	Chromium	7440-47-3	5.0
D023	o-Cresol	95-48-7	\4\ 200.0
D024	m-Cresol	108-39-4	\4\ 200.0
D025	p-Cresol	106-44-5	\4\ 200.0
D026	Cresol		\4\ 200.0
D016	2,4-D	94-75-7	10.0
D027	1, 4-Dichlorobenzene	106-46-7	7.5
D028	1, 2-Dichloroethane	107-06-2	0.5
D029	1, 1-Dichloroethylene	75-35-4	0.7
D030	2, 4-Dinitrotoluene	121-14-2	\3\ 0.13
D012	Endrin	72-20-8	0.02
D031	Heptachlor (and its epoxide)	76-44-8	0.008
D032	Hexachlorobenzene	118-74-1	\3\ 0.13
D033	Hexachlorobutadiene	87-68-3	0.5
D034	Hexachloroethane	67-72-1	3.0
D008	Lead	7439-92-1	5.0
D013	Lindane	58-89-9	0.4
D009	Mercury	7439-97-6	0.2
D014	Methoxychlor	72-43-5	10.0
D035	Methyl ethyl ketone	78-93-3	200.0
D036	Nitrobenzene	98-95-3	2.0
D037	Pentachlorophenol	87-86-5	100.0
D038	Pyridine	110-86-1	\3\ 5.0
D010	Selenium	7782-49-2	1.0
D011	Silver	7440-22-4	5.0
D039	Tetrachloroethylene	127-18-4	0.7
D015	Toxaphene	8001-35-2	0.5
D040	Trichloroethylene	79-01-6	0.5
D041	2, 4, 5-Trichlorophenol	95-95-4	400.0
D042	2, 4, 6-Trichlorophenol	88-06-2	2.0
D017	2, 4, 5-TP (Silvex)	93-72-1	1.0
D043	Vinyl chloride	75-01-4	0.2

\1\ Hazardous waste number.

\2\ Chemical Abstracts Service (CAS) number.

\3\ Quantitation limit is greater than the calculated regulatory level. The quantitation limit therefore Becomes the regulatory level.

\4\ If -, m- and p-Cresol concentrations cannot be differentiated, the total cresol (D-026) concentration is used. The regulatory level of total cresol is 200 mg/l.

7.0 DATA REVIEWS

As stated in Sections 4.2 and 5.2, in order to meet quality assurance (QA) requirements of the D&D Program, data collected during characterization **SHALL** be reviewed prior to incorporation into final reports to determine usability and compliance with RFCA and minimum quality requirements. Reviews include data verification/validation, PARCC evaluations (i.e., evaluation of data precision, accuracy, representatives, completeness and comparability), and data quality assessment. For radionuclides, these requirements only apply during final status survey. Characterization conducted during the reconnaissance level and in-process phase **SHALL** follow the Radiological Control Manual and established Radiological Safety Practices Procedures. The review process is described below.

7.1 DATA VERIFICATION AND VALIDATION (V&V)

Verification **SHALL** be performed on all sets of data produced by the project on which decisions are based. Validation **SHALL** be performed on minimum percentages of data/data packages as stipulated in the project-specific sampling plan.

Project managers **SHALL** plan for V&V accordingly (i.e., ensure adequate funding, schedule, and personnel to achieve data quality requirements as the project progresses); comprehensive V&V immediately before final reporting is typically too late to allow for data disparity corrective actions. Budgeting is typically based on the estimated number of samples/analyses planned for the project, and is some percentage of the cost per survey of analysis.

Data verification ensures that the requirements stated in characterization plans were implemented as prescribed. For example, verification ensures that requirements relative to the data produced by the project are satisfactory with respect to quantity, types, and format of data specified in the applicable planning documents, (e.g., electronic data deliverables (EDDs), data packages (hardcopies), reports, data forms, etc.). The attached checklist (Table 7-1) itemizes the aspects of D&D data that **SHALL** be verified. In addition, every D&D report **SHALL** also present, as appendices, attachments, concise reference, etc., the entire data set used for decisions as defined in the DQO section. The attached data become a critical part of the CERCLA Administrative Record, which further verifies the D&D measurements of interest. A section of the report **SHALL** explain the steps and criteria used for data verification AND validation (a.k.a. data confirmation), including qualified and rejected data, and a summary table of all methods used, real samples, and QC samples. All data (100%) **SHALL** be verified.

In contrast to data verification, data validation is an in-depth technical review of the data (or a representative percentage of the data) that determines whether characterization was performed within quality control requirements and tolerances. Depending on the project and the critical nature of samples, a percentage of the entire data may be validated, so long as the percentage is representative.

For example, validation percentages must include the following:

- each laboratory;
- each subcontractor;

- each medium (matrix or material type); and
- each method (e.g., SW-846 or radiochemical).

A validation rate of greater than/equal to 25% has precedence at the RFETS, based on acceptance (via approved work plans) by EPA Region VIII and CDPHE. However, depending on the number of critical samples or surveys for a given project, higher frequencies of validation may be desired for higher confidence. MARSSIM Appendix N also provides guidance for data validation.

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Table 7-1 Data Verification Checklist

	Caveat?	Compliance?	
1. DATA PACKAGE			
a) Cover page is intact and meets requirements of the analytical/radiochemistry Statement of Work (SOW)			
a) Data Review Checklist, from the SOW, completed & authenticated by subcontractor			
All data package components are present per SOW, including case narrative, and all results & controls out of tolerance.			
a) Chain-of-Custody forms attached, completed, and authenticated			
a) discrepancy or nonconformance reports			
a) sample turnaround, holding times, & preservation reqs were met			
2. SAMPLE RESULTS SUMMARY			
a) For each survey shot (in situ) or sample, the results shall include the following: analytes, activity, units, TPU, MDA, method for calculating MDA, system ID, location ID, geometry, and any comments.			
b) All results reported for each requested analyte/radionuclide			
c) Appropriate use of significant figures.			
a) appropriate use and reporting of dilutions			
e) Electronic and/or hardcopy of spectral library (one-time submittal)			
e) final results are traceable to original samples or survey locations			
f) Electronic and/or hardcopy of final spectra from measured areas/sources			
g) Results from measured areas correlated to location, measurement set ID, and any related QC measurements (i.e., energy calibrations, efficiency calibrations, replicates, blanks (background), and control area)			
2A. QC SAMPLE RESULTS SUMMARY			
a) Calibrations certificates for radioactive sources and/or chemical standards (one-time submittal)			
b) Source check results within tolerance			
c) Blank (background) measurements are reported, including location and MDA			
d) For locations/samples that required re-analysis, all measurement set information included with the results.			
e) For each QC sample type (e.g., replicate, background, LCS, MS, IS, etc.) the QC type and number for each batch of measurements			
f) For each QC sample, the results shall include the following: QC type and identification, analytes, activity, units, uncertainty at 3-sigma , MDA, location ID, geometry, and any comments.			
g) All QC deficiencies are detailed in the Narrative.			
h) The following information is required for each replicate sample: MDA, location identification and the comparative analyte results.			
I) The following information is required for the Control Area (CA) Results: CA standard value, CA standard uncertainty at 3-sigma and CA ī% recovery.			

j) The Preparation Blank activity meets the requirements specified in RC03, Exhibit E, if applicable			
k) Detector characterization specifications, for each detector, including peak shapes (one-time submittal)			
l) MDA determination at 95% confidence w/ ≥ 5 replicate measurements (one-time submittal)			
3. INSTRUMENT CALIBRATION SUMMARY	***Caveat?***	***Compliance?***	
a) The energy calibration parameters are within established tolerances, and are reported as specified in ∋ 2.8.2 of the SOW, including: instrument and detector ID, date, source ID, energy span and geometry used, linear response of system and gain.		*Yes*	*No*
b) The background shot information will include the following: instrument and detector ID, date, start and end region of interest (ROI).			
c) Detector efficiency information will include the following: instrument and detector ID, date of the efficiency analysis, calibration source ID, matrix, geometry, detector characterization data and characterization verification data.			
5. COUNTING RAW DATA SUMMARY			
The raw data summary will consist at a minimum of the following: analysis date and time, instrument ID, SOP identifier, location ID, QC locations and identifications, and the analysts initials.			
6. ELECTRONIC DATA DELIVERABLE (EDD)			
a) The EDD is compliant with the applicable SOW (content and format).			
b) Completeness of data ≥ 95% (i.e., data qualified as Rejected, based on Validation, <5%)			

Respond to each checklist item in the Caveat? column with a footnote as applicable and provide the caveat in the Footnotes section below.

FOOTNOTES:

I certify that all responses to this checklist accurately reflect the completeness and quality aspects of this sample data package. Furthermore, I understand that inaccuracies in the completion of this checklist will be considered a nonconformance to Subcontract Requirements as evidenced by the following signature of the laboratory manager or designee.

Print/Typed Name: _____ Title: _____

Signature _____ Date _____

7.2 PARCC EVALUATIONS

Following verification/validation, the data set **SHALL** be evaluated relative to the PARCC parameters (i.e., precision, accuracy, representatives, completeness and comparability). PARCC parameters **SHALL** be assessed and summarized to ensure compliance with minimum quality requirements (see the D&D QAPP), and communication of compliance (and any exceptions) to the regulators and stakeholders. The basis for assessing each of these elements of data quality is discussed in the following subsections.

7.2.1 Precision

Precision measures the reproducibility of measurements. It is strictly defined as the degree of mutual agreement among independent measurements as the result of repeated application of the same process under similar conditions. *Analytical* precision is the measurement of the variability associated with duplicate (two) or replicate (more than two) analyses. D&D QA **SHALL** use the laboratory control sample (LCS) to determine the precision of the analytical method. If the recoveries of analytes in the LCS are within established control limits, then precision is within limits. In this case, the comparison is not between a sample and a duplicate sample analyzed in the same batch, rather the comparison is between the sample and samples analyzed in previous batches. *Total* precision is the measurement of the variability associated with the entire sampling and analysis process. It is determined by analysis of duplicate or replicate field samples and measures variability introduced by both the laboratory and field operations. Field duplicate samples and matrix duplicate spiked samples **SHALL** be analyzed to assess field and analytical precision, and the precision measurement **SHALL** be determined using the relative percent difference between the duplicate sample results. For replicate analyses, the relative standard deviation **SHALL** be determined.

7.2.2 Accuracy

Accuracy is a statistical measurement of correctness and includes components of random uncertainty (variability due to imprecision) and systemic error. It therefore reflects the total uncertainty associated with a measurement. A measurement is accurate when the value reported does not differ from the true value or known concentration of the spike or standard. Analytical accuracy **SHALL** be measured by comparing the percent recovery of analytes spiked into an LCS to a control limit. For volatile and semivolatile organic compounds, surrogate compound recoveries **SHALL** also be used to assess accuracy and method performance for each sample analyzed. Analysis of performance evaluation (PE) samples shall also be used to provide additional information for assessing the accuracy of the analytical data being produced. Both accuracy and precision **SHALL** be calculated for each D&D QA analytical batch, and the associated sample results **SHALL** be interpreted by considering these specific measurements.

7.2.3 Representatives

Objectives for representatives are defined for each sampling and analysis task and are a function of the investigative objectives. Representatives **SHALL** be achieved through use of the standard field, sampling, and analytical procedures. Representatives **SHALL** also be determined

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by appropriate program design, with consideration of elements such as proper well locations, drilling and installation procedures, and sampling locations.

7.2.4 Completeness

Completeness **SHALL** be calculated for the aggregation of data for each analyte measured for any particular sampling event or other defined set of samples. Completeness **SHALL** be calculated and reported for each method, matrix and analyte combination. The number of valid results divided by the number of possible individual analyte results, expressed as a percentage, **SHALL** determines the completeness of the data set. For completeness requirements, valid results **SHALL** be all results not rejected (due to inadequate quality control). The requirement for completeness **SHALL** be 95 percent for aqueous samples and 90 percent for solid samples. For any instances of samples that could not be analyzed for any reason (e.g., holding time violations in which re-sampling and analysis were not possible, samples spilled or broken, etc.), the numerator of this calculation **SHALL** become the number of valid results minus the number of possible results not reported. The formula for calculation of completeness is presented below:

$$\% \text{ completeness} = \frac{\text{number of valid results}}{\text{number of possible results}} \times 100$$

7.2.5 Comparability

Comparability is the confidence with which one data set can be compared to another data set. One of the objectives of characterization is to produce data with the greatest possible degree of comparability. The number of matrices that are sampled and the range of field conditions encountered are considered in determining comparability. Comparability **SHALL** be achieved by using standard methods for sampling and analysis, reporting data in standard units, normalizing results to standard conditions and using standard and comprehensive reporting formats. Complete field documentation using standardized data collection forms **SHALL** support the assessment of comparability. Analysis of PE samples and reports from audits **SHALL** also be used to provide additional information for assessing the comparability of analytical data produced among subcontracting laboratories. Historical comparability **SHALL** be achieved through consistent use of methods and documentation procedures throughout the project.

7.3 DATA QUALITY ASSESSMENT (DQA)

DQA is a scientific and statistical evaluation that determines if the data are of the right type, quality, and quantity to support their intended use, which is to make decisions regarding D&D. The decisions and the decision-rules are defined within the DQO framework. Although some data assessment may be performed before or in-parallel with data verification/validation (i.e., confirmation), the DQA **SHALL** not be final until verification and validation are complete. This restriction is necessary since the data assessment assumes that the individual data constituting statistics and parameters are satisfactory for their intended purpose and based on quality requirements. Data quality is not assumed, but measured.

Appendix A

The RFETS Characterization Process

Appendix B

The D&D Characterization Process Logic Diagram

Appendix C

Annotated Outlines of Plans and Reports

HEALTH AND SAFETY

- Discuss how characterization/survey activities implement the RFETS ISM Program.
- Discuss PPE based on building and COCs (hazard identification).
- Discuss contamination and other controls (Rad and Non-Rad), including RWPs, CAs and CRZs, postings, personnel and area monitoring, decontamination, etc., based on hazards identification.
- Discuss ongoing data review used to assess adequacy of controls and implementation of any control changes.

QUALITY ASSURANCE

Applicable QA Programs
Personnel Training and Qualification
Document Control and Records / Data Management
Change Control
Procurement
Inspection and Acceptance Testing
Assessments and Continuous Improvement

PROJECT ORGANIZATION (Roles and Responsibilities)

REFERENCES

APPENDICES

Radiological Survey Instructions
Applicable Decommissioning Characterization Protocols and Procedures
Others as Appropriate

- PCBs
- Chlorinated Solvents
- Other Organics
- Others

- Asbestos
- Pressurized Gas and Liquid Nitrogen
- Electrical
- Wastes
  - Hazardous Waste
  - LLW and LLMW
  - TRU and TRU Mixed Waste
  - Asbestos Waste
  - PCB Waste
  - Non-Rad / Non-Haz
- Other

DECOMMISSIONING WASTE TYPES AND VOLUME ESTIMATES

DATA CONFIRMATION AND DATA QUALITY ASSESSMENT

FINAL BUILDING / CLUSTER CATEGORIZATION (TYPE) AND NEXT STEPS IN THE DECOMMISSIONING PROCESS

Discuss building categorization based on characterization/survey results in terms of the DQO "Problem" and "Decisions".